**ADVANCED PROGRAMMING**

Developed a report on observing where C++ 17 and Python 3 are both getting popular programming languages used in various domains, including coding contests. Let's compare and contrast their similarities, differences, and code efficacy based on the given real-world example.

**Question**: Compare and contrast the similarities, differences and code efficacy between C++ 17 and Python3 with a real-world example

**Real world Example**:

Coding contests are held at universities where registered students can participate.

What are their chances of scoring? What factors are considered into grading their performance? I would like to know how the evaluation and verification of the code is carried out with the reference code which has already been updated in the application when the code is submitted?

**DESCRIPTION:**

Consider an evaluation application in which several segments are involved, such as evaluating scores, checking and verifying solutions, using code environments (IDE), and practicing, etc.

We chose the topic of evaluating the candidates' scores.

The candidates' solutions will be verified against the reference solution in the application, which has already been updated. Comparing the reference solution with the candidates' solutions entails some prime considerations. In this work, we are focusing on whether the solution matches the reference solution in terms of percentage.

As a first step, 100% of the solution is divided into:

1.In the question, sample inputs and outputs should match the inputs and outputs of the candidate's solution, resulting in 40% of the marks awarded until the remaining conditions are met.

2.A candidate's output must be less than or equal to the reference output if the maximum memory allocated for the output is updated. This accounts for 20% of the marks.

3.Candidates will receive 20% of the marks if their output is less than or equal to the execution time of the reference output.

4.There are hidden inputs that must be present in the reference solution and in the candidate solution. If the candidate solution meets these conditions, the remaining 20% of the mars will be awarded.

**Output validity with sample inputs:**

Here the comparison of the code takes place using following c++ code. Generally, we are going with declaring 2 strings. Here 1st String is the reference code output which is required to evaluate the candidate code output.2nd string is the output code of the one candidate to get evaluate by reference code output. By comparing the strings present in the output we can get conclude with the 40% score can be established. This result can be concluded after getting possible score in remaining three aspects of score getting. If similarity

percentage for the both codes is 100% then the output weightage 40% can be valid to add for the score.

int t[str1.size()][str2.size()];

int max=0;

for(int i=0;i<=str1.size();i++){

t[i][0] = 0;

}

for(int j=0;j<=str2.size();j++){

t[0][j] = 0;

}

for(int i=1;i<=str1.size();i++){

for(int j=1;j<=str2.size();j++){

if(str1[i-1] == str2[j-1]){

t[i][j] = t[i-1][j-1] +1;

if(max < t[i][j]){

max = t[i][j];

}

}

else{

t[i][j]=0;

}

}

}

cout<<max<<endl;

int a=str1.size();

int b=str2.size();

float per1 = (float(max)/a) \* 100;

float per2 = (float(max)/b) \* 100;

cout<<"the string 1 is similar to str2 by percentage: "<<per1<<endl;

cout<<"the string 2 is similar to str1 by percentage: "<<per2<<endl;

if(per1==100)

{

If(per2==100)

{

Cout<<”validity of output is perfect”;

}

}

}

Particulars messages are been generated with validity of the output:

1)AC - Accepted

2)WA - Wrong Answer

3)IR - Invalid Return

**Output validity with Hidden inputs:**

Here the process of validating the extra inputs takes place. Which gives maximum effectiveness of the code done by the candidate. Here also same process repeated which done before for the validating the output with the sample inputs. This we are categorising with 20% of the score updation.

If outputs gets match we can conclude that,candidate scored 20% of the total score.

**Execution memory:**

Here the process is comparing the execution memory using c++ code. Generally, we are going with declaring 2 integers. Here 1st integer val1 is the execution memory of the reference code.2nd integer val2 is the execution memory of one of the candidate code. Mainly here we are focussing the execution memory which gives less than or equal to execution time of the reference code. By using if condition and we are tallying with 20% of the score in this checking. This result impact in getting accepting the score of output validity of the candidate code.

**C++ code:**

int main(){

int val1;

int val2;

cin>>val1;

cin>>val2;

if(val2 <= val1)

{

Cout<<”execution memory is perfect”;

}

}

Particulars messages are been generated with execution time problem:

#### 1) OLE - Output Limit Exceeded

#### 2) MLE - Memory Limit Exceeded

**Execution time:**

Here the process is comparing the execution time using c++ code. Generally, we are going with declaring 2 integers. Here 1st integer val1 is the execution time of the reference code.2nd integer val2 is the execution time of one of the candidate code. Mainly here we are focussing the execution time which gives less than or equal to execution time of the reference code. By using if condition and we are tallying with 20% of the score in this checking.This result impact in getting better score for the candidate.

C++ code:

int main(){

int val1;

int val2;

cin>>val1;

cin>>val2;

if(val2 <= val1)

{

Cout<<”execution time is perfect”;

}

Particulars messages are been generated with execution time problem:

1)RTE - Runtime Exception

#### 2) TLE - Time Limit Exceeded

**WHY C++:**

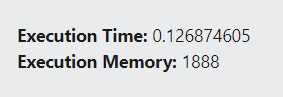
There are a few conditions by which we can say c++ is better in evaluating than python

Multithreading

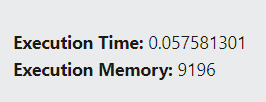
Multithreading is a specialized form of multitasking and allows computer to run two or more programs concurrently.

Here when we are evaluting candidates scores we can seperate them in different threads and all the threads can be concurrently run and can give the desired output.

C++ Code given the following execution time and memory for the comparing the outputs:



Python Code given the following execution time and memory for the comparing the outputs:



**Conclusion:**

We are taken with C++ code for our casestudy. Even we can do with python but python is getting disadvantages in some aspects like getting more memory for execution,GIL(GLOBAL INTERPRETER LOCK) is a mechanism in python involves synchronize the execution of threads so that only one thread can be execute at a time, hence for the evaluating several candidates, it takes a lot of time. So we are done our casestudy Role of evalution in Coding Platform.